

CLAIMS

1. An alcohol concentration detecting apparatus in which an alcohol concentration in the liquid to be inspected is detected by introducing a liquid to be inspected between electrodes of an alcohol concentration detecting sensor and by measuring a change in a specific inductive capacity of the liquid to be inspected between the electrodes with an oscillation frequency,

wherein the alcohol concentration detecting sensor comprises an alcohol concentration detecting sensor body including a base material resin film, an electrode wiring pattern formed on the base material resin film, and an insulating resin covering a surface of the electrode wiring pattern.

2. The alcohol concentration detecting apparatus according to claim 1, wherein the alcohol concentration detecting sensor body is stuck onto a substrate.

3. The alcohol concentration detecting apparatus according to claim 1 or 2, wherein the electrode wiring pattern is obtained by selectively etching a conductive metallic foil laminated on one of surfaces of the base material resin film, thereby forming a wiring pattern taking a predetermined shape.

4. The alcohol concentration detecting apparatus according to any of claims 1 to 3, wherein the electrode wiring pattern has such a shape that positive and negative electrodes
5 which are comb-toothed are alternately intricate.

5. An alcohol concentration detecting apparatus in which an alcohol concentration in the liquid to be inspected is detected by introducing a liquid to be inspected between
10 electrodes of an alcohol concentration detecting sensor and by measuring a change in a specific inductive capacity of the liquid to be inspected between the electrodes with an oscillation frequency,

wherein the alcohol concentration detecting sensor
15 comprises a substrate, an electrode wiring pattern formed on the substrate, and an insulating coat covering a surface of the electrode wiring pattern.

6. The alcohol concentration detecting apparatus
20 according to claim 5, wherein the electrode wiring pattern is obtained by selectively etching a conductive metallic thin film formed on one of surfaces of the substrate by sputtering, thereby forming a wiring pattern taking a predetermines shape.

7. The alcohol concentration detecting apparatus according to claim 5 or 6, wherein the insulating coat is formed by chemical vapor deposition (CVD).

5 8. The alcohol concentration detecting apparatus according to any of claims 5 to 7, wherein the electrode wiring pattern has such a shape that positive and negative electrodes which are comb-toothed are alternately intricate.

10 9. An alcohol concentration detecting method of detecting an alcohol concentration in a liquid to be inspected by using the alcohol concentration detecting apparatus according to any of claims 1 to 8,

wherein an alcohol concentration in the liquid to be
15 inspected is detected by introducing a liquid to be inspected between electrodes of an alcohol concentration detecting sensor and by measuring a change in a specific inductive capacity of the liquid to be inspected between the electrodes with an oscillation frequency.

20 10. An alcohol concentration detecting method wherein the liquid to be inspected is a gasoline containing alcohol.

11. A method of manufacturing an alcohol concentration

detecting sensor, comprising:

a conductive metallic foil sticking step of sticking a conductive metallic foil onto one of surfaces of a base material resin film;

5 a photoresist applying step of applying a photoresist onto a whole upper surface of the conductive metallic foil;

a photoresist exposing step of exposing the photoresist to take a desirable electrode wiring pattern shape by using a photoresist mask;

10 a photoresist dissolving and removing step of dissolving and removing the exposed photoresist portion with a developing solution;

an etching step of etching and removing a conductive metallic foil portion which is not covered with the photoresist,
15 with an etchant;

a photoresist dissolving and removing step of dissolving and removing the photoresist; and

an insulating resin applying step of applying an insulating resin onto the surface from which the photoresist is removed,
20 thereby obtaining an alcohol concentration detecting sensor body.

12. The method of manufacturing an alcohol concentration detecting sensor according to claim 11, further

comprising a substrate sticking step of sticking the alcohol concentration detecting sensor body obtained at the insulating resin applying step, onto a substrate.

5 13. The method of manufacturing an alcohol
concentration detecting sensor according to claim 11 or 12,
wherein the base material resin film is a polyimide resin film.

10 14. The method of manufacturing an alcohol
concentration detecting sensor according to any of claims 11
to 13, wherein the conductive metallic foil is a copper foil.

15 15. The method of manufacturing an alcohol
concentration detecting sensor according to any of claims 11
to 14, wherein the insulating resin is constituted by at least
one selected from an urethane resin, a polyimide resin and an
epoxy type resin.

20 16. The method of manufacturing an alcohol
concentration detecting sensor according to any of claims 11
to 15, wherein the electrode wiring pattern has such a shape
that positive and negative electrodes which are comb-toothed
are alternately intricate.

17. A method of manufacturing an alcohol concentration detecting sensor, comprising:

a conductive metallic thin film forming step of forming a conductive metallic thin film on one of surfaces of a substrate
5 by sputtering;

a photoresist applying step of applying a photoresist onto a whole upper surface of the conductive metallic thin film;

a photoresist exposing step of exposing the photoresist to take a desirable electrode wiring pattern shape by using a
10 photoresist mask;

a photoresist dissolving and removing step of dissolving and removing the exposed photoresist portion with a developing solution;

an etching step of dry etching and removing a conductive
15 metallic thin film portion which is not covered with the photoresist;

a photoresist dissolving and removing step of dissolving and removing the photoresist; and

an insulating coat forming step of forming an insulating
20 coat on a surface of the electrode wiring pattern from which the photoresist is removed, by chemical vapor deposition (CVD),

18. The method of manufacturing an alcohol concentration detecting sensor according to claim 17, wherein

the substrate is constituted by at least one selected from ceramics, glass and a resin substrate.

19. The method of manufacturing an alcohol
5 concentration detecting sensor according to claim 17 to 18,
wherein the conductive metallic thin film is constituted by at
least one selected from platinum, nickel, copper and titanium.

20. The method of manufacturing an alcohol
10 concentration detecting sensor according to any of claims 17
to 19, wherein the insulating coat is constituted by at least
one minute insulating coat selected from SiO_2 , Al_2O_3 and the like.

21. The method of manufacturing an alcohol
15 concentration detecting sensor according to any of claims 17
to 20, wherein the electrode wiring pattern has such a shape
that positive and negative electrodes which are comb-toothed
are alternately intricate.